25

30

10

CLAIMS

- 1. An aqueous cathodic electrocoating composition comprising a binder of (a) a cathodically electrodepositable film forming resin and (b) a polyisocyanate crosslinking agent blocked with a non-hazardous, non- air polluting compound and 0.1-5.0% by weight, based on the weight of the binder, of a water miscible amine acid zwitterion additive comprised of the reaction product of an amine acid and an alkylglycidy ether.
- The aqueous cathodic electrocoating composition of claim 1 in which the non-hazardous, non-air polluting compound is selected from the group consisting of an alkoxy alkanol and an alkyl alcohol.
- The aqueous cathodic electrocoating composition of claim 2 in which the amine acid zwitterion additive is the reaction product of an amine acid of the formula HOOC - R - NH₂ and an alkyl glycidyl ether of the formula

$$\bigcap_{i=1}^{N} \bigcap_{j=1}^{N} R^{j}$$

where R is selected from the group consisting of an aliphatic radical and an aromatic radical and R^1 is an aliphatic radical.

4. The aqueous cathodic electrocoating composition of claim 2 in which the amine acid zwitterion additive has the formula of

$$-OOC \longrightarrow R \longrightarrow \begin{matrix} H & OH \\ NH & - \\ + & \end{matrix}$$

where R is selected from the group consisting of an aliphatic radical and an aromatic radical and \mathbb{R}^1 is an aliphatic radical.

The aqueous cathodic electrocoating composition of claim 3 in which the amine acid consists of para aminobenzoic acid and the alkyl glycidyl ether has an epoxy equivalent weight of 200 - 500.

25

30

5

10

- The aqueous cathodic electrocoating composition of claim 2 in which the non-hazardous non-air polluting compound is alkoxy propanol.
- The aqueous cathodic electrocoating composition of claim 2 in which the non-hazardous, non-air polluting compound is an alkyl alcohol having 1-3 carbon atoms in the alkyl group.
 - 8. The aqueous cathodic electrocoating composition of claim 2 in which the cathodically electrodepositable film forming resin comprises a polyepoxy amine adduct neutralized with an acid selected from the group consisting of formic acid, acetic acid, lactic acid, phosphoric acid, sulfamic acid, sulfonic acid and mixtures thereof.
 - 9. The aqueous cathodic electrocoating composition of claim 1 in which the binder comprises 30 to 70% by weight based on the weight of the binder of the cathodically electrodepositable film forming resin comprising a polyepoxy amine adduct neutralized with an acid selected from the group consisting of formic acid, acetic acid, lactic acid, phosphoric acid, sulfamic acid, sulfonic acid and mixtures thereof and 30 to 70% by weight of the binder of a polyisocyanate crosslinking agent blocked with a non-hazardous, non-air polluting compound selected from the group consisting of an alkoxy alkanol and an alkyl alcohol having 1-3 carbon atoms in the alkyl group and in which the water miscible amine acid zwitterion additive comprises the reaction product of an amine acid of the formula HOOC R NH₂ and an alkyl glycidyl

ether of the formula

where R is selected from the group consisting of an aliphatic radical and an aromatic radical and R^1 is an aliphatic radical having 1-25 carbon atoms.

10. A process for cathodically electrocoating an electrically conductive object which comprises the steps of (1) immersing the object in a bath of the electrocoating composition of claim 1 and (2) cathodically

electrodepositing a film on the object, (3) removing the coated object and (4) baking the object at 125-175°C to form a continuous film thereon.